REMARKS

No claims are being cancelled. Claims 1-17 are being amended. Claims 18-20 are being added. Upon entry of this amendment claims 1-20 will be pending in the application.

The amendment to claim 1 is supported by the specification at page 1, line 7 (molecular ingredient weight lower than 10,000) and page 5, lines 23-24 (increasing pressure at a temperature within five degrees of room temperature).

The amendment to claim 2 (sealing the packing container) is supported by Figure 1 and the specification at page 8, lines 6-8.

The amendment to claims 3-5 (stepwise increase of pressure and/or stepwise release of pressure) is supported by the specification at page 3, line 28 to page 4, line 14.

The amendment to claim 6 (multiple extractions of biological material) is supported by the specification at page 4, lines 15-18.

The amendment to claims 13-16 (step of heating or cooling) is supported by the specification at page 5, lines 13-17.

New claims 18 and 19 are supported by the specification at page 3, line 28 to page 4, line 14.

New claim 20 is supported by the specification at page 5, lines 23-24.

The rejection of claims 1-17 under 35 U.S.C. §112, first paragraph.

The Official communication asserts that the claims contain subject matter that was not described in the specification. More particularly, the Official communication asserts that the written description of the specification, including 3 examples, does not adequately support claims to "*all* molecules from all biological materials" (emphasis in original).

In fact, the process of extracting small molecular ingredients from biological materials is not as complicated as stated in the Official communication. The process for

extracting the chemical components from biological material which comprises plants, animal (e.g. Eupolyphaga sinensis Walker, Whitmania pigra Whitman, Pheretima vulgaris Chen and Bufo melanostictus Schneider, etc.) and fungi (e.g. Coriolus Versicolor, Cordyceps sinensis, Ganoderma lucidum, etc.) is well known in the field of natural medicine and especially in Chinese traditional medicines. The traditional extraction process of biological material comprises adding water to the air dried raw biological material, decocting for hours and then obtaining the extract dissolved in water. This traditional extraction process has been used for thousands of years. Thus, there is a wealth of knowledge as to what small molecular ingredients can be extracted from which biological materials using which solvents. However, these traditional methods are carried out at atmospheric pressure and may take hours or days.

A search of the U.S. Patent Office indicates that at least 16 patents have been issued for inventions that disclose decocting. Among these issued patents is U.S. 7,005,146 for a decocted mixture for the treatment of extensive cancer and U.S. 5,128,148 for a process of producing dried earthworm powder that may subsequently be decocted for pharmaceutical use.

The present application builds on these thousands of years of experience in selecting raw materials to obtain, through traditional extraction processes, a desired extract. However, the present application uses super high pressure to release the desired extract components into the solvent much more quickly. Thus, the specification description is adequate to describe how to apply this enhanced process to the existing wealth of traditional knowledge.

Further, Applicant has clarified that the small molecular ingredients have a molecular weight lower than 10,000.

Thereby, in the light of what is known in the art and what is disclosed in the specification, a skilled person would understand that the breadth of the claimed invention is described in the specification. Applicant respectfully traverses this rejection. Claims 1-17 are enabled and patentable for at least this reason.

The rejection of claims 1-17 under 35 U.S.C. §112, first paragraph.

The Official communication asserts that the claims contain subject matter that is not enabled in the specification.

- **This rejection does not meet the legal burden necessary to properly assert a 35 U.S.C. §112, first paragraph rejection.**

  35 U.S.C. section 112, first paragraph reads:

  > The specification shall contain a written description of the invention and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same, and shall set forth the best way contemplated by the inventor of carrying out his invention.

Additionally, the courts have interpreted the enablement requirement to require that the specification teach those in the art to make and use the invention without "undue experimentation". As set out in In re Wands, 858 F.2d 731, 737; 8 USPQ2d 1400, 1404 (Fed. Cir. 1988), factors to be considered in determining whether required experimentation is undue include:

1. The breadth of the claims;
2. The nature of the invention;
3. The state of the prior art;
4. The level of a person of ordinary skill;
5. The level of predictability in the art;
6. The amount of direction provided by the inventor;
7. The existence of working examples in the specification; and
8. The quantity of experimentation needed to make or use the invention based on the content of the disclosure.

The courts have pointed out that "[n]ot every last detail [of an invention need] be described [in a patent specification], else patent specifications would turn into production specifications, which they were never intended to be." In re Gay, 135 USPQ 311,316 (C.C.P.A. 1962). Citing the opinion in Gay, the Board of Patent Appeals and Interferences echoed this point in its statement that " the law does not require a

specification to be a blueprint to satisfy the requirement for enablement under 35 U.S.C. 112, first paragraph," Staehelin v. Secher, 24 USPQ2d 1513, 1516 (Bd. Pat. App. & Int. 1992). Even more broadly, the MPEP states the specification need not disclose what is well known to those skilled in the art and preferably omits that which is well known to those skilled and already available to the public. See MPEP section 2164.05(a).

The United States Patent and Trademark Office recognizing the above legal authority has promulgated Training Materials For Examining Patent Applications With Respect To 35 U.S.C. 112, First Paragraph-Enablement Chemical/Biotechnical Applications. As stated in these training materials at section III, paragraph 6, with bolding added: "**It is improper to conclude that a disclosure is not enabling based on an analysis of only one of the above [Wands] factors** while ignoring one or more of the others. The examiner's analysis **must** consider all the evidence related to each of these factors, and any conclusion of non-enablement **must** be based on the evidence as a whole."

The Official communication does not discuss any of the Wands factors. As such, this rejection is improper under the United States Patent and Trademark Office training materials. Applicant respectfully traverses this rejection. Claims 1-17 are enabled and patentable for at least this reason.

- **The cited "High pressure" and Brown references.**

The Official communication supports this rejection of claims 1-17 by stating: "High pressure treatment is commonly used in the food art to inactivate microorganisms and enzymes (biological materials)(see attached 'High pressure treatment of foods') and it is known in the art that high pressure treatment will inactivate prions (proteins) (see Brown et al). Thus the state of the art suggest that applying super high pressure to some biological materials will in fact, damage the molecular structures of molecular components."

A closer inspection of the Brown reference indicates that high pressure AND temperature was used. See Tables 1-3 therein where the high pressure samples were

exposed to temperatures of 121 to 137 °C, the same temperature range that was used in that reference for autoclaving. In fact, the Brown reference appears to suggest a type of high pressure autoclaving. Applicant's specification at page 5, lines 23-24 indicates that the extraction process is normally carried out at room temperature, which is substantially lower than the temperatures used in the Brown reference.

The "High pressure treatment of foods" reference is a single web page that states: "The high pressure (400-800 MPa) inactivates microorganisms and enzymes while having little effect on flavour and nutritional value." There is no disclosure of the mechanism that lead to these results. There is no disclosure of using high pressure to extract components.

The Official communication asserts that high pressure must cause "damage to the molecular structures of molecular components". However, if damage to all molecular structures MUST occur from high pressure exposure, how does this method leave those molecular components responsible for flavor and nutrition intact?

As discussed above the present application uses super high pressure to release desired extract components into the solvent much more quickly than conventional decocting methods. One possible mechanism for releasing extract components is breaking the cell membrane. Breaking a cell membrane would likely inactivate a microorganism. Thus, the disclosure of the cited "High pressure treatment of foods" reference is not contradictory to Applicant's disclosure.

- **Applicant's disclosure.**

As discussed above the present application builds on thousands of years of experience in selecting raw materials to obtain, through traditional extraction processes, a desired extract. However, the present application uses super high pressure to release the desired extract components into the solvent much more quickly. Further, Applicant has clarified that the small molecular ingredients have a molecular weight lower than 10,000.

Thereby, in the light of what is known in the art and what is disclosed in the

specification, a skilled person would understand how to practice the claimed invention to the existing wealth of traditional knowledge. Applicant respectfully traverses this rejection. Claims 1-17 are enabled and patentable for at least this reason.

The rejection of claims 1-17 under 35 U.S.C. §112, second paragraph.

The Official communication asserts that the claims 1-17 are indefinite. The claims have been amended to more closely align them with current U.S. practice. Claims 1-17 are in condition to overcome this rejection.

The rejection of claims 1-3, 6, 10-12 and 17 under 35 U.S.C. §102(b).

Claims 1-3, 6, 10-12 and 17 were rejected under 35 U.S.C. §102(b) as having each and every feature and interrelationship anticipated by Japanese reference JP04244203. Applicant respectfully disagrees with the basis for this rejection.

As explained to Applicant's U.S. representative (without translation) the JP 04244203 reference alleges that the process therein increases the concentration of the extract and reduces extraction time. The process of the JP 04244203 reference requires heating as stated in paragraph 0027 of the description. The work temperature is preferable from 40 °C to 60 °C. All the examples in the JP 04244203 reference are carried out at 50 °C. The process of Example 1 comprises pressurizing at 50 °C under 800 MPa for 60 min; extracting under stirring; and neutralizing with HCl. The process of Example 2 is similar to that of Example 1 but the solvent and the acid for neutralizing are different.

It is well known in this art that exposure to high temperatures will inactivate many, if not most, bioactive ingredients. In fact, high temperature combined with high pressure is the basis for some sterilization procedures such as autoclaving. So that working temperature is an important technical feature in the field of biology.

The presently claimed invention increases extraction efficiency and prevents the

loss of active ingredients caused by heating. The presently claimed invention is carried out at a temperature within five degrees of room temperature (See Claim 1). Applicant respectfully traverses this rejection. Claims 1-3, 6, 10-12 and 17 are not anticipated by the JP 04244203 reference for at least this reason.

As explained to Applicant's U.S. representative (without translation) Claim 1 of the JP 04244203 reference states: carrying out pressurization treatment to the mixture before the conventional extraction; or carrying out conventional extraction simultaneously. The process of Example 1 comprises pressurizing at 50 °C under 800 MPa for 60 min; extracting under stirring; and neutralizing with HCl. The process of Example 2 is similar to the one of Example 1 but the solvent and the acid for neutralizing. The specification does not demonstrate how to carry out pressurization and extraction simultaneously. Applicant respectfully traverses this rejection. Claims 1-3, 6, 10-12 and 17 are not anticipated by the JP 04244203 reference for at least this reason.

The rejection of claims 1-17 under 35 U.S.C. §103(a).

Claims 1-17 were rejected under 35 U.S.C. §103(a) as being unpatentable over Japanese references JP 04244203, JP 09140337 and JP 04256405.

- **This rejection does not meet the legal burden necessary to properly assert a 35 U.S.C. §103 rejection.**

The Official communication admits at page 9:

> The references do not teach that pressure is applied in the manner claimed, that the mixture is further processed, wherein the process occurs multiple times, or wherein heat or cooling is applied. However, at the time of the claimed invention, such steps were routinely practice (sic) in the art when extracting substances under high pressure. Thus, at the time the claimed invention was made, it would have been well within the purview of one of ordinary skill in the art to optimize the various parameters of the methods, to include the manner by which pressure is applied, how often and under cool/heated conditions, as a matter of routine experimentation.

MPEP § 2142, citing Ex parte Stern, 13 USPQ 2nd 1379, 1381 (Bd. Pat. App. & Inter. 1989), states (with underlining added) that the burden is on the Examiner to demonstrate that the prior art evidences sufficient suggestion of the desirability of doing what the inventor has done. The Examiner cannot discharge himself from the above burden by simply declaring all of the elements of an invention, along with the manner of combining these elements, to be well known in the art. Further, when the PTO asserts that there is an explicit or implicit teaching or suggestion in the prior art, it must indicate where such a teaching or suggestion appears in the reference. In re Yates, 211 USPQ 1149, 1151 (CCPA 1981).

The Official communication admits that all of the presently claimed features are not found in the cited references. Than, the Official communication goes on to reject Applicants claims over only the unsupported statement that these unfound features are well known in the art. Applicant respectfully traverses this rejection. The Examiner should either provide a citation showing that these unfound features are well known in the art as required by the MPEP and relevant legal precedent or withdraw this rejection. Claims 1-17 are not obvious over the JP 04244203, JP 09140337 and JP 04256405 references, singly or in combination, for at least this reason.

- **The legal burden necessary to properly assert a 35 U.S.C. §112, first paragraph rejection.**

As stated in MPEP §2143, to establish a *prima facie* case of obviousness three basic criteria must be met. First, there must be some suggestion or motivation, either in the references themselves or in the knowledge generally available to one of ordinary skill in the art, to modify the reference or combine the reference teachings. Second, there must be a reasonable expectation of success. Finally, the prior art reference (or references when combined) must teach or suggest all the claim limitations.

The JP 04244203 reference.

As discussed above the process of the JP 04244203 reference requires heating as stated in paragraph 0027 of the description.

The JP 09140337 reference.

The process and equipment disclosed in the JP 09140337 reference requires the solvent to be alkaline, electrolysed water (see the English translation of the abstract and attached English translation of the specification at paragraph 0008 and paragraphs 0016 and 0017). Further, the JP 09140337 reference requires heating (see element 16 in the cover figure and English translation of the specification at paragraph 0015: "The heating unit 16 . . . and alkalai ion water can be heated now even at about 60 degrees C.").

The JP 04256405 reference.

The JP 04256405 reference discloses use of high pressure to enhance clarification of an existing extractant. See the attached English language Abstract and Constitution.

- **The cited references fail to teach the claimed invention.**

A prior art reference or combined references must teach or suggest all of the limitations of a claim to be prior art under §103. MPEP §2143 and In re Wilson, 165 USPQ 494, 496 (C.C.P.A. 1970).

The JP 04244203 and JP 09140337 references both appear to require substantial (50°C in JP 04244203 and 60°C in JP 09140337) heating of the solution being extracted. As discussed above Applicant's presently claimed invention is carried out at about room temperature. These cited references are not asserted to disclose or suggest extraction at about room temperature.

The JP 04256405 reference discloses use of high pressure to enhance clarification of an existing extractant. The disclosure of the JP 04256405 reference does not disclose use of high pressure during extraction.

Applicant respectfully traverses this rejection. Claims 1-17 are not obvious over the JP 04244203, JP 09140337 and JP 04256405 references, singly or in combination, for at least this reason.

- **There is no suggestion or motivation to combine the cited references.**

A reference that teaches away from a claimed invention does not provide the suggestion or motivation needed to anticipate or make obvious a claimed invention. In fact, the courts have stated that a reference that teaches away from a claimed invention is an indication of the nonobviousness of that invention. "A reference, however, must have been considered for all it taught, disclosures that diverged and taught away from the invention at hand as well as disclosures that pointed towards and taught the invention at hand." Ashland Oil, Inc. v. Delta resins & Refractories, Inc., 227 USPQ 657, 666 (Fed. Cir. 1985). "One important indicium of nonobviousness is 'teaching away' from the claimed invention by the prior art." In re Braat, 16 USPQ2d 1813, 1814 (Fed. Cir. 1990). The prior art reference must be considered in its entirety, including portions that would lead away from the claimed invention. See MPEP 2141.02. A "reference will teach away if it suggests that the line of development flowing from the reference's disclosure is unlikely to be productive of the result sought by the Applicant." Winner v. Wang, 202 F.3d 1340 (Fed Cir. 2000) citing Gurley at 553.

As discussed above Applicant's presently claimed invention is carried out at about room temperature. The JP 04244203 and JP 09140337 references both appear to require substantial (50°C in JP 04244203 and 60°C in JP 09140337) heating of the solution being extracted. These cited references therefore teach away from high pressure extraction at about room temperature. The JP 04256405 reference discloses use of high pressure to enhance clarification of an existing extractant. The disclosure of the JP 04256405 reference does not disclose use of high pressure during extraction.

The JP 04244203 and JP 09140337 references both teach away from the presently claimed invention. There is no motivation to ignore the explicit disclosures of the JP 04244203 and JP 09140337 references to attempt to find the features of

Applicant's claims. The JP 04256405 reference is just not relevant to the presently claimed invention. Claims 1-17 are not obvious over the JP 04244203, JP 09140337 and JP 04256405 references, singly or in combination, for at least this reason.

In summary, Applicants have addressed each of the objections and rejections within the present Office Action. It is believed the application now stands in condition for allowance, and prompt favorable action thereon is respectfully solicited.

The Examiner is invited to telephone Applicant's attorney if it is deemed that a telephone conversation will hasten prosecution of this application.

Respectfully submitted,

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DETAILED DESCRIPTION

[Detailed Description of the Invention]
[0001]
[Field of the Invention] This invention relates to the high-pressure foods extract approach and high-pressure foods extractor which extract the extractives contained in foods, such as kelp.
[0002]
[Description of the Prior Art] While the delicious meal which has flavor more with development of meal culture is demanded and the class of foods increases conventionally, the cooking approach is also diversified. The extractives seasoning of foods various for seasoning, such as characteristic flavor, ****, and substance, is used especially for various dishes. The approach of obtaining this extractives seasoning has a common method of dipping foods in liquids, such as water, and extracting those extractives, and has approaches, such as a water extract to which it acts as Mizuide and is called law by the class of liquid to be used, and an alkali extract using a NaOH solution, an alcoholic extract, a liquefied gas extract. Moreover, there are also the heating method which heats liquids, such as water, and is extracted by high temperature in order to speed up [from which extractives are extracted apart from these], and a high-pressure approach which carries out high-pressure processing of the foods, and extracts extractives. The extractives furthermore extracted are condensed or drying and processing it, making it the shape of powder, stuffing a pack etc. and making preservation and transportation easy is also known. However, there is a trouble that it cannot save for a long period of time that, as for law, a microorganism etc. tends to breed by acting as Mizuide if it remains as it is as an extract taking time amount, although tastes, such as flavor, ****, and substance, are maintained. Moreover, although it is made the shape of as [concentration liquid] or powder, and it can store in a container and preservation and transportation are made easy while the approach of heating and condensing the heating method and the extracted extractives shortens extract time amount and a microorganism etc. can be sterilized Low molecular weight compounds, such as a vitamin contained in foods, and a scent, coloring matter, decompose, or it evaporates, and there is a trouble that tastes, such as flavor of foods original, ****, and substance, will change. Similarly, although it acted as Mizuide of the high-pressure approach and it could shorten extract time amount rather than law, it required time amount rather than the heating method, and had the trouble that control of concentration was difficult.
[0003] Then, the conventionally following techniques (JP,62-32864,A) are proposed as what has improved these troubles. About the manufacturing method of kelp extractives, this technique tends to dip kelp in water, tends to heat it at about 80 degrees C, and tends to extract kelp extractives, and it is going to compensate the taste of the kelp which added sugar-alcohol to what carried out vacuum concentration of this extracted liquid, and was spoiled by heating, and flavor with it.
[0004] On the other hand, the conventionally following techniques (JP,3-112463,A) are also proposed about the technique which carries out high-pressure processing of the foods. This technique carries out hydrostatic-pressure pressure treatment of the slurry which has a yeast-fungus object, and there are few yeasty flavours and they tend to obtain the strong yeast extract of ******.
[0005]
[Problem(s) to be Solved by the Invention] However, the manufacturing method of the kelp extractives seasoning indicated by JP,62-32864,A had the trouble that a vitamin, coloring matter, and a scent were spoiled by concentration of extractives of that with which sugar-alcohol can be added and the taste of kelp and flavor can be compensated.
[0006] Moreover, equipment benefited large-sized the hydrostatic-pressure pressurization of what can obtain the strong yeast extract of ******, and the manufacture approach of the yeast extract indicated by JP,3-112463,A could not check extract extent of extractives during extract actuation, and also had troubles, like control becomes complicated.
[0007] Then, this invention solves said conventional trouble and is easy structure. Control of extract actuation is easy, and make the sampling volume of extractives into max and the amount of the foods used is stopped few. Without spoiling a vitamin, coloring matter, and a scent, tastes, such as flavor of

foods original, ****, and substance, do not change, and it aims at offering the high-pressure foods extract approach and high-pressure foods extractor which install in a kitchen, and it can be safe and can be extracted easily.

[0008]

[Means for Solving the Problem] In order to attain the above-mentioned purpose, the high-pressure foods extract approach of this invention is characterized by extracting the extractives which electrolyze water while mincing foods, such as kelp, in predetermined magnitude, hold the alkali ion water and foods which were generated by electrolysis in a high pressure vessel, pressurize 50MPa-200MPa, and are contained in foods.

[0009] By this, pH concentration and a pressure can be adjusted, the sampling volume of foods extractives can be carried out in a short time at max, and the amount of the foods used can be stopped few.

[0010] Moreover, the high-pressure foods extractor of this invention is characterized by having the ion water generation section which electrolyzes water, the pressurization container which holds and pressurizes the alkali ion water and foods which were generated in the ion water generation section, and the booster pump which applies a pressure to a pressurization container.

[0011] By this, the alkali ion water of predetermined pH concentration can be chosen, water can be supplied to a pressurization container, and the pressure of predetermined magnitude can be pressurized.

[0012]

[Embodiment of the Invention] Invention of this invention according to claim 1 electrolyzes water while mincing foods, such as kelp, in predetermined magnitude. The alkali ion water and foods which were generated by electrolysis are held in a high pressure vessel. The extractives which pressurize 50MPa-200MPa and are contained in foods are extracted, high-concentration extractives can be extracted in alkali ion water, without using a chemical, and it has an operation that high-pressure processing can raise even to saturated concentration further.

[0013] Moreover, invention according to claim 2 is equipped with the ion water generation section which electrolyzes water, the pressurization container which holds and pressurizes the alkali ion water and foods which were generated in the ion water generation section, and the booster pump which applies a pressure to a pressurization container, and it has an operation that alkali ion water can be pressurized at high pressure, and the extractives of foods, such as kelp, can be extracted, without using a chemical.

[0014] Moreover, invention according to claim 3 is equipped with the control means which computes the concentration of an extract from the pH value detected by pH sensor which detects pH of the extract in a pressurization container, and pH sensor, and controls a booster pump, and it has an operation that extract actuation is continuable, supervising the concentration of the extract in a pressurization container.

[0015] Hereafter, the gestalt of operation of this invention is explained using drawing 5 from drawing 1 .

(Gestalt 1 of operation) Drawing 1 is the outline block diagram of the high pressure vessel of the high-pressure foods extractor by the gestalt of 1 operation of this invention. In drawing 1 , 1 is constituted from the owner bottom-like container 2 and the top cover 3 by the high pressure vessel. These consist of the quality of the material of the stainless steel which has corrosion resistance and was excellent in pressure resistance, equip the fitting section of a top cover 3 and a container 2 with a proof-pressure O ring etc., and make it the structure where the pressure of 300MPa extent can be borne. The pressure sensor 6 and the high-pressure bulb 7 which detect the temperature sensor 5 which detects the solution temperature of the alkali ion water 21 with which established the interior of a high pressure vessel 1 and a free passage way open for free passage in the top cover 3, and it was filled up in the high pressure vessel 1, and a pressure are prepared. 8 is a pH sensor which opens the high-pressure bulb 7, is made to breathe out a part of extract, and detects the pH concentration. The interior of a high pressure vessel 1 and a free passage way open for free passage were established in the pars basilaris ossis occipitalis of a container 2, and the supply channel 14 which supplies water to a high pressure vessel 1 in alkali ion water 21, and the exhaust passage 18 which discharges the extract which extracted the extractives

contained in foods 22 are formed. The booster pump 11 which attracts the alkali ion water 21 which stored water to the high-pressure bulb 12 and the water tank 17, and pressurizes and carries out the regurgitation is formed in the supply channel 14. This booster pump 11 pressurizes the alkali ion water 21 in a high pressure vessel 1 directly, and pressurizes foods 22 with the hydrostatic pressure of 200MPa extent, and the thing of a reciprocation mold is suitable for it here. The heating unit 16 which becomes a water tank 17 from an electric heater etc. is formed, and alkali ion water 21 can be heated now even at about 60 degrees C. 15 breathes out the alkali ion water 21 generated in the ion water generation section 40 later mentioned by the alkali ion water discharge passage, and stores water to a water tank 17. The high-pressure bulb 9 is formed in exhaust passage 18, and the extracts discharged from exhaust passage 18 are collected by the container 19 for recycling. Foods 22 are minced in magnitude predetermined with kelp, and are contained by the mesh-like basket 23. This basket 23 is for making easy receipts and payments of the foods 22 inside a high pressure vessel 1 with making it the thing of the shape of waste of foods 22 not flow into exhaust passage 18. 20 controls and carries out the temperature control of the power supplied to a heating unit 16 with the detection signal from a temperature sensor 5, controls the power supplied to a booster pump 11 with the detection signal from a pressure sensor 6, and adjusts the pressure in a high pressure vessel 1 while it controls the pressurization of a high pressure vessel 1, and pressure-lowering actuation by the control section. Moreover, a control section 20 will start supply of power to a booster pump 11, if the start button which is not illustrated is pushed, it carries out specified quantity water supply into a high pressure vessel 1, it continues and pressurizes water supply actuation further behind, pushes the start button which will not be illustrated if a predetermined pressure is reached, and stops a booster pump 11. In addition, the discharge passage which prepared a relief valve like the drawing 4 publication may be prepared in a supply channel 14.

[0016] Actuation of the ion water generation section 40 is explained below. 38 is divided by the septum 34 with a cell and the cathode room 33 and the anode plate room 32 are formed. A cathode 31 is formed in the cathode room 33, the positive electrode 30 is formed in the anode plate room 32, and the negative potential and the forward potential of a direct current which were controlled by the control section 20 are impressed to each. These electrodes form or form [clothing] with noble metals, such as platinum, etc., and its long thing of a life is good. 35 is raw water ways, such as tap water, and supplies water to the cathode room 33 and the anode plate room 32 in raw water. 15 is the alkali ion water discharge passage which carries out the regurgitation of the alkali ion water 21 generated at the cathode room 33, pH concentration of the alkali ion water 21 which the 2nd pH sensor 37 is formed and carries out the regurgitation is detected, it transmits to a control section 20, and a control section 20 controls the magnitude of the power impressed to a cathode 31 and the positive electrode 30 so that it may become predetermined pH concentration. 36 is an acid ion water discharge passage which carries out the regurgitation of the acid ion water generated at the anode plate room 32.

[0017] A cell 38 lets flow the raw water to which water was supplied from the raw water way 35. If a direct current (electrical potential difference 40 [about] V and current about 5A) is impressed to a cathode 31 and the positive electrode 30 while a flow rate lets flow about 1l. the raw water which is a part for /, the raw water which it let flow will be electrolyzed here, alkali ion water 21 will generate it in the cathode room 33, and acid ion water will generate it in the anode plate room 32. The flow rate of the alkali ion water 21 generated at this time is a part for about 0.8l./. The regurgitation of the generated ion water is carried out from each discharge passage. Thus, about [pH=10] alkali ion water 21 is continuously generable by electrolyzing letting raw water flow. pH concentration of this alkali ion water 21 that carries out the regurgitation is controllable by the magnitude of the direct current to impress to arbitration. For example, if the direct current whose electrical potential difference is about 30V and whose current is about 3A is impressed, about [pH=8] alkali ion water 21 can be obtained.

[0018] The high-pressure foods extract approach which used the high pressure vessel 1 constituted as mentioned above is explained based on drawing 1 . The top cover 3 prepared in the high pressure vessel 1 is removed from a container 2, and the basket 23 which contained about 10g of kelp from Hokkaido East Hokkaido beforehand minced in the magnitude of about 1cm angle extent is held in the base of a container 2. Next, if it seals top-cover 3, it closes and a start button is pushed, a control section 20 will

start water supply. First, while the high-pressure bulbs 12 and 7 can open first, the high-pressure bulb 9 is closed. Next, a control section 20 drives a booster pump 11, pressurizes the alkali ion water 21 which stored water to the water tank 17 beforehand, and supplies water in a high pressure vessel 1 through a supply channel 14. This alkali ion water 21 keeps it warm to predetermined temperature beforehand by carrying out ON-OFF control of the heating unit 16 if needed according to the class of foods 22. It did not heat in the gestalt of this operation, but the alkali ion water 21 of ordinary temperature was used. Moreover, in the ion water generation section 40, beforehand, this alkali ion water 21 is adjusted so that it may become predetermined pH concentration. Although the one where pH concentration is larger is desirable for the extract of foods 22 extractives, if pH concentration is large to remainder, the burden placed on the equipment which generates alkali ion water 21 will become large, or cost will become high. Therefore, it is appropriate to use the alkali ion water 21 adjusted to about pH=10 so that it might mention later.

[0019] Into a high pressure vessel 1, about 11. supplies water, alkali ion water 21 is filled, and if alkali ion water 21 overflows from opening of the high-pressure bulb 7, since a pressure sensor 6 will exceed a predetermined value, a control section 20 closes the high-pressure bulb 7. The alkali ion water 21 with which the booster pump 11 had water supply actuation continued, and was succeedingly filled in the high pressure vessel 1 by the directions from a control section 20 is pressurized gradually. The magnitude of the pressure of this pressurized alkali ion water 21 is detected by the pressure sensor 6, and is transmitted to a control section 20. If being chosen between 50-200MPa(s) is appropriate and the magnitude of this pressure has it, it will require time amount for the extract of foods 22 extractives, and if larger than this, the work cost of a high pressure vessel 1 will become high. [smaller than this] If the control section 20 is made to memorize the magnitude of the predetermined pressure of the 50-200MPa (s) beforehand, if the pressure is reached, a control section 20 will take out directions to a booster pump 11 with the detection signal of a pressure sensor 6, and if it becomes smaller than a predetermined pressure by the stop, leakage, etc. about pressurization actuation, pressurization actuation can be started again. Extractives, such as glutamic acid contained in foods 22 by holding the inside of the predetermined time high pressure vessel 1 in this pressurization condition, are extracted by alkali ion water 21. In the case of foods 22, it is enough in 10 or less minutes. Since these foods 22 are pressurized by isotropic pressure, a pressure can act that there is no futility in homogeneity, and can extract high-concentration extractives in a short time. Moreover, since alkali ion water 21 is used, it can extract still more easily.

[0020] If supplemented about a high-pressure foods extractor here, the ion water generation section 40 will generate the alkali ion water 21 by which pH control was carried out continuously by the directions from a control section 20, and water will be stored to the water tank 17. Whenever the alkali ion water 21 which stored water to the water tank 17 is used and it decreases, by a sensor (not shown) etc., water level is detected and it transmits to a control section 20, and at least water takes out directions to the ion water generation section 40, generates alkali ion water 21, and, as for a control section 20, stores water to a water tank 17 in an initial complement. pH concentration can be adjusted to arbitration. Although water is once stored to the water tank 17 in the generated alkali ion water 21 here, the alkali ion water discharge passage 15 can be directly linked with a supply channel 14, and water can also be supplied directly. A water tank 17 and a feed pump 13 are less necessary by carrying out like this, and a high-pressure foods extractor can be made into a small light weight. In addition, although a booster pump 11 is the thing of an electric form and was explained, you may be the thing of a manual form.

[0021] By the way, before ending pressurization actuation, it is necessary to investigate whether the extractives of kelp were extracted by the extract to near the saturated concentration. Then, in the gestalt 1 of this operation, open the high-pressure bulb 7, a part of extract is made to breathe out, pH concentration of an extract is detected by the pH sensor 8, and it judges whether the extract was fully performed. Whenever it forms a timer and predetermined time passes, this is attained because a control section 20 opens the high-pressure bulb 7 a little. The saturated concentration of the glutamic acid of the extract of the extractives of foods 22 is about 600mg/l. in ordinary temperature, and, then, pH concentration is about 6.5 or less. When the relation between the saturated concentration of this glutamic

acid and pH concentration is the most important and glutamic acid reaches saturated concentration, pH concentration has a relation of becoming small. When pH concentration which follows, for example, the pH sensor 8 detects is about 8, it is judged as that to which glutamic acid has not reached even saturated concentration yet, the high-pressure bulbs 7 and 9 are closed, by the booster pump 11, a high pressure vessel 1 is pressurized again and extract actuation is continued. If it does in this way, extractives can be extracted effectively and foods 22 will not be made useless. Moreover, if this high pressure vessel 1 is installed near the cooking site, the extract of the extractives of the foods 22 collected by the container 19 for recycling can be used for seasoning of cooking as it is in a cooking site.

[0022] (Gestalt 2 of operation) Below, when the magnitude of the pressure of a high pressure vessel is changed, signs that the sampling volume of the extractives of foods 22 changes are explained based on drawing 2 . Drawing 2 is the related Fig. showing the pressure and sampling volume of a high pressure vessel of the high-pressure foods extract approach by the gestalt of another operation of this invention. Here, temperature held the alkali ion water 21 of pH=10 in the high pressure vessel 1 with 1l. and foods 22 in ordinary temperature, and pressurized the pressure for 5 minutes at the step of 50MPa(s) from 50 to 200MPa(s), respectively. With the Yanamoto automatic amino acid analyzer (L-Yanaco 7 mold), the sampling volume of the extractives of foods 22 carried out quantitative analysis of the glutamic acid contained in an extract, and asked for it. The amount of the used foods 22 is four kinds, 5g, 10g, 15g, and 400g, and 2a, 2b, and 2c and 2d have shown it, respectively. If a pressure becomes large in any case, the sampling volume is increasing. Since there are too few amounts of foods 22 for the case of 5g shown by 2a, even if it enlarges a pressure to 200MPa(s), there are few sampling volumes in 1. and about 200mg /. A pressure follows 2b which set the amount of foods 22 to 10g, and 2c set to 15g on becoming large, a sampling volume increases, and if a pressure is enlarged to 200MPa(s), a sampling volume will reach even the saturated concentration of 1., 600mg /, and glutamic acid. If it is made [many] on the other hand to the extent that the amount of foods 22 is set to 400g and it passes over it enough, as shown in 2d, it turns out that it is extracted even near the saturated concentration also under ordinary pressure (0.1MPa). That is, by pressurizing and extracting foods 22 to 200MPa(s) with alkali ion water 21, if there is no less than 10g of amounts of foods 22, it can extract easily even near the saturated concentration, and the amount of the foods 22 to need can be made few to about about 1 / 4. Moreover, when the former acted as Mizuide and the 10g foods 22 were dipped into 1l. of pH= alkali ion water of 10 by law, it required for glutamic acid reaching even saturated concentration for about 14 hours. However, according to 2b of drawing 2 , even saturated concentration can be reached by pressurization for [small] 5 minutes in 200MPa(s), and it can be shortened even to the time amount of abbreviation 6/1000.

[0023] As for the magnitude of this pressure, it is desirable that it is in the range of 50-200MPa, and it is because time amount borrows from reaching the saturated concentration of a sampling volume in 50 or less MPas too much and extract concentration does not become high any more in 200 or more MPas.

[0024] (Gestalt 3 of operation) Below, when pH concentration of alkali ion water 21 is changed next, signs that the sampling volume of the extractives of foods 22 changes are explained based on drawing 3 . Drawing 3 is the related Fig. of pH concentration of the alkali ion water 21 of the high-pressure foods extract approach according to the gestalt of another operation further of this invention, and a sampling volume. Here, temperature held 1l. and foods 22 for the alkali ion water 21 which is about 20 degrees C in the high pressure vessel 1 with 15g, and pressurized the pressure for 5 minutes by 100MPa(s) (3a shows) and 200MPa(s) (3b shows). The sampling volume of the extractives of foods 22 was measured according to (the gestalt 2 of operation). And pH concentration of alkali ion water 21 was changed from pH=7 (neutral water) to pH=13. When a pressure is 3a of 100MPa(s), when pH concentration became high and alkalinity became large, the sampling volume increased, and if it comes to about pH=10, even the saturated concentration of glutamic acid is reached. On the other hand, if a pressure is made large even to 200MPa(s) like 3b, the thing of pH=7 has also reached even saturated concentration. That is, a pressure can be lowered even to one half by using the alkali ion water 21 of pH=10 here. Moreover, what is necessary is for about [of alkali ion water 21] pH=10 to be suitable when the amount of foods 22 is set to 15g with the gestalt 3 of this operation, but just to choose the alkali ion water 21 of suitable

pH concentration, as it carries out more than pH=10 if it will be made less than [pH=10] if the amount of foods 22 is made [more] than 15g, and it is made fewer than 15g.
[0025] Thus, the alkali extract of the extractives of foods 22 can be performed using alkali ion water 21, handling is not complicated like [in the case of using NaOH], and tastes, such as original flavor of foods 22, ****, and substance, can be maintained, without Na ion mixing in an extract.
[0026] (Gestalt 4 of operation) Below, based on drawing 4 , a pressurization piston is prepared in a high pressure vessel 1, and the high-pressure foods extractor which pressurizes alkali ion water 21 with this pressurization piston is explained. Drawing 4 is the outline block diagram of the high-pressure foods extractor by the gestalt of other operations of this invention. Also in the gestalt of this operation, since it is fundamentally the same, the thing of the same sign as drawing 1 omits explanation. In drawing 4 , the high pressure vessel 1 consists of cylinder-like containers 2, top covers 3, and the pressurization pistons 4. The sliding section with the container 2 of the pressurization piston 4 is equipped with a proof-pressure O ring etc., and the container 2 is made into the structure where the pressure of 300MPa extent can be borne. The high-pressure bulb 12 and the alkali ion water 21 which stored water to the water tank 17 are attracted in a supply channel 14, and the feed pump 13 which carries out the regurgitation is formed in it. 11 pushes up the pressurization piston 4 with oil pressure through the high-pressure bulb 10 by the booster pump, and pressurizes the alkali ion water 21 with which the interior of a high pressure vessel 1 was filled up. 20 is a control section and pressure regulation is carried out by controlling the power supplied to a booster pump 11 with the detection signal from a pressure sensor 6. Pressure regulation of 24 is carried out so that it may be prepared in the oil discharge passage 26 of a pressurization circuit by the relief valve and may become a constant pressure. In addition, although the pressurization piston 4 is driven by the oil hydraulic cylinder, also when a counter balance circuit is prepared and a pressurization condition is dispelled, an abrupt change produces it.
[0027] The high-pressure foods extract approach which used the high pressure vessel 1 constituted as mentioned above is explained based on drawing 4 . the top cover 3 prepared in the high pressure vessel 1 is removed from a container 2, and the basket 23 which contained about 10g of foods 22 from Hokkaido East Hokkaido which size-came to about 1cm angle extent beforehand, and were boiled and minced is held in the top face of the pressurization piston 4. Next, if it seals top-cover 3, it closes and a start button (not shown) is pushed, a control section 20 will start water supply. First, while the high-pressure bulbs 12 and 7 can open first, the high-pressure bulb 9 is closed. Next, a control section 20 drives a feed pump 13, and supplies water to a supply channel 14 in a high pressure vessel 1 through the alkali ion water 21 which was beforehand generated in the ion water generation section 40, and stored water to the water tank 17. Here, the alkali ion water 21 of ordinary temperature similarly adjusted to about pH=10 with the gestalt 1 of operation having described was used. In addition, if a head difference is given to a water tank 17, a feed pump 13 is omissible.
[0028] Into a high pressure vessel 1, about 1l. supplies water, alkali ion water 21 is filled, and if it checks that alkali ion water 21 overflows from opening of the high-pressure bulb 7 and a stop button is pushed, a control section 20 will stop a feed pump 13. A control section 20 closes the high-pressure bulbs 12 and 7 to coincidence, and makes a high pressure vessel 1 a sealing condition at it. Subsequently, the high-pressure bulb 10 can open, and with the directions from a control section 20, a booster pump 11 has actuation started and pushes up the pressurization piston 4 in a container 2. The pressurization piston 4 pushed up pressurizes gradually the alkali ion water 21 filled in the high pressure vessel 1. The magnitude of the pressure of this pressurized alkali ion water 21 is detected by the pressure sensor 6, and is transmitted to a control section 20. If a control section 20 is made to memorize the predetermined pressure of the 50-200MPa(s) beforehand and it sets, if the pressure is reached, a control section 20 will take out directions to a booster pump 11 with the detection signal of a pressure sensor 6, and pressurization actuation can be resumed if it becomes smaller than a stop and a predetermined pressure about pressurization actuation. Since the relief valve 24 is formed in the oil discharge passage 26 of the circuit from this booster pump 11, there is little ON-OFF actuation of a booster pump 11, and it ends. Moreover, it is also good after pressurization to stop the high-pressure bulb 10. Extractives, such as glutamic acid contained in foods 22 by holding this pressurization condition predetermined time, are

extracted by alkali ion water 21. Since these foods 22 are pressurized by the hydrostatic pressure of the alkali ion water 21 pressurized by the pressurization piston 4, a pressure can act that there is no futility in homogeneity, and can extract high-concentration extractives in a short time.

[0029] During pressurization actuation, by the pH sensor 8, pH concentration of the extract in a high pressure vessel 1 is detected, and the signal is always transmitted to the control section 20. Therefore, it detects that the control section 20 reached predetermined pH concentration, a booster pump 11 is stopped, and the pressurization piston 4 is put back. Since a control section 20 opens the oil exhaust valve 27 put side by side to the relief valve 24 at this time, the pressure in a high pressure vessel 1 declines to ordinary pressure by this. After checking that the high pressure vessel 1 has returned to ordinary pressure with a pressure sensor 6, the high-pressure bulbs 7 and 9 are opened, and extracts are collected in the container 19 for recycling. Although the above-mentioned explanation pushed up the pressurization piston 4 with oil pressure, if food is treated at all, it is also good to push up with water pressure.

[0030] Although the extract of the extractives of kelp was explained here, the same effectiveness is acquired even if it will use other foods 22, if not only kelp but an alkali extract can extract extractives.

[0031]

[Effect of the Invention] As mentioned above, according to this invention, while mincing foods, such as kelp, in predetermined magnitude, water is electrolyzed. The alkali ion water and foods which were generated by electrolysis are held in a high pressure vessel. It has the effectiveness that tastes, such as flavor of foods original, ****, and substance, do not change, without making the sampling volume of extractives into max, stopping the amount of the foods used few, and spoiling a vitamin, coloring matter, and a scent, since 50MPa-200MPa is pressurized.

[0032] Moreover, it has the ion water generation section which electrolyzes water, the pressurization container which holds and pressurizes the alkali ion water and foods which were generated in the ion water generation section, and the booster pump which applies a pressure to a pressurization container, and with easy structure, control of extract actuation is easy and it has the effectiveness that it installs in a kitchen, and it can be safe and can extract easily.

[0033] Moreover, it has the control means which computes the concentration of an extract from the pH value detected by pH sensor which detects pH of the extract in a pressurization container, and pH sensor, and controls a booster pump, and has the effectiveness of making the sampling volume of extractives into max further, and stopping the amount of the foods used few.

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(54) IMPROVED METHOD FOR CLARIFYING SUSPENSION

(57)Abstract:

PURPOSE: To improve efficiency in liq.-solid separation and to enhance the clarification degree of a soln. by treating a suspension at the high pressure of ≥300 MPa before the suspension, especially the suspension of an insoluble salt complex, is clarified by liq.-solid separation.

CONSTITUTION: The suspended matter is separated from the suspension of an insoluble salt complex by filtration or precipitation to clarify the suspension. In this case, the suspension is treated under high pressure before or during the separation of the suspended matter. An org. extract such as a polysaccharide extract, fungus extract or their neutralized liq. or a microbe culture soln. are exemplified as the insoluble salt complex. The appropriate range of the pressure in the high-pressure treatment is easily set as desired because its critical condition is essential for the separation efficiency in clarification, and the pressure is preferably set at ≥300 MPa (hydrostatic pressure). The high-pressure treating time is appropriately set in conformity to the extractant similarly to the pressure and is preferably controlled to about 10-30 min.

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